

Forfeiting legal protections to prevent crime?

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I. Introduction

In recent years public perceptions of crime have caused an increasingly urgent appetite for public safety that prioritizes the proactive prevention of crime.¹ Though increasing the effectiveness of crime prevention often requires more intrusive policing methods, these tactics have generally been met with a collective acceptance of the concessions necessary for comprehensive safety. In other words, despite the reality that thwarting future crime requires targeting presently innocent individuals, any meaningful outcry has largely been limited to legal scholars and defence advocates. This article will argue that as police capacity for the prevention of crime increases, the legal protective counterpoint afforded suspects in the form of procedural safeguards must also be expanded.

The article will begin by briefly highlighting changing attitudes toward crime control, before explaining one of the popular, emergent forms of crime prevention, namely the practice of predictive policing. Predictive policing is a method gaining momentum in Europe that relies on existing theories of criminology enhanced by quickly advancing technology, most often artificial intelligence (AI). Due to the emerging nature of this technology, the article will approach the topic of predictive policing in a general manner, taking examples from European and EU law, as well as from the United States where predictive policing is more commonly used. It will be the goal of the article to illustrate some of the more universal legal consequences of crime prevention. The explanation of predictive policing will lead to a deeper discussion on potential infringements of individual rights, demonstrating that the methods used do not differ significantly from traditional methods of criminal investigation, but in contrast, do not confer any defence rights on subjects of preventative investigation. It will further argue that if and when legal protections are extended to the preventative investigation of crime, their effectiveness may be negated by the use of sophisticated technology such as AI, which blurs established legal standards of fairness.

Finally, the article will posit that by extending the use of investigatory or coercive methods to the general prevention of crime without ensuring proper legal safeguards, many of the established principles of criminal law as accepted in a democratic society are compromised in practice. This section will describe some of the foundational precepts of fairness that extend through the criminal justice system and stand at the core of the legal process.

¹ See David Garland, *The Culture of Control* (University of Chicago Press, 2001); also Ulrich Sieber, "The New Architecture of Security Law – Crime Control in the Global Risk Society," 2018.

II. Policing by prevention

Predictive policing is a quickly growing method of policing which falls under the umbrella of crime prevention, a means of crime disruption that aims to anticipate and avert opportunities for crime before it can occur. Unlike the more familiar and prominent method of crime control in which police response is reactive to the commission of crime, prevention requires a specifically constructed, forward-looking body of knowledge.² The concept of crime prevention is not new, but the addition of AI and the availability of massive amounts of data have sophisticated the practice, allowing its scope to expand and evolve dramatically in recent years. Whereas prevention formerly relied on simple heuristics and vigilant police work, the integration of massive amounts of data has effectively made it possible to investigate crime before it is committed. The shift toward prevention has been ignited in part by a collective recognition and fear of the emergence and prevalence of cybercrime and international terrorism, and fuelled by the increase of populism around the world.³ Simultaneously, technology and the increasing availability and networkability of data have enhanced the ability of police to anticipate and thwart crime.⁴ The combination of a focus on crime prevention and an enabled reliance on data and technology has precipitated the adoption of an actuarial approach to preventing crime, in which the commission of crime is treated as an avoidable risk.

Relying on information to anticipate future crime relies on the synthesis of discrete packets of data, or risk factors, which together may inform the probability of crime, in essence creating a criminal risk assessment. In other words predictive policing uses a form of actuarial science in which statistical calculations may be utilized to ascertain risk. The actuarial approach to crime control functions much like an insurance policy, in which public security is the collective good and crime the harm to be avoided.⁵ By conceptualizing crime as an assemblage of factors that make criminal behaviour more or less likely, risk is calculated based on the aggregate and spread across the population.⁶ Actuarial calculations are fed by vast troves of data, which compute all known relevant

2 Brandon Welsh and David Farrington, *The Oxford Handbook of Crime Prevention* (Oxford University Press, 2012) pp. 3-12.

3 *Supra* Note 2 at 3-5.

4 Litska Strikwerda, "Predictive Policing: The Risks Associated with Risk Assessment," *Police Journal: Theory, Practice and Principles*, 2020, 1-15 at 5.

5 See Pat O'Malley, "Risk and Responsibility," in *Foucault and Political Reason* (Taylor & Francis Group, 1996). See also Kevin D. Haggerty and Richard V. Ericson, *Policing the Risk Society* (University of Toronto Press, 1997).

6 de Laet, "The Disciplinary Power of Predictive Algorithms: A Foucauldian Perspective" pp. 321.

factors to produce a risk assessment, in other words, to calculate the probability that an event such as crime will occur.⁷ This approach may be seen as efficient in that it does not indiscriminately target individuals and trigger fear of government overreach, but also contributes to a utilitarian style of management centred on the efficient allocation of resources.⁸ Determining risk based on known information allows police to discard traditional patrols that rely on numerous, fruitless interventions and instead adopt information-led policing, or 'targeted governance.'⁹ Though using information as a tool may offend a sense of privacy, it may be argued that the pervasiveness of technology in daily life makes its near invisible utilization in policing more palatable and less shocking to the average conscience. This article will refer to the functional aspect of predictive policing as actuarial or risk assessments, or predictive analysis, interchangeably.

Even though anticipating crime by risk assessment is a scientific calculation produced by inherently objective means, it is complicated by the fact that criminal behaviour is imbued with moral implications which may only be established by human decision-makers. Crime is an asocial behaviour we consider to be an exception or deviation from the norm, so predicting its occurrence is to attribute normative value to particular behaviours which together we believe make crime more likely.¹⁰ Therefore, a human must inform a machine which combination of risk factors are responsible for increasing the likelihood of crime, as well as their weighted relative values, divesting the process of total objectivity. Achieving objectivity is further complicated by the fact that as we seek to predict not yet committed crime, it is only possible to anticipate its occurrence using past information on known crime, basing the risk factors on historical, proxy information.¹¹

Another important aspect of forming a risk assessment is that none of these factors alone make crime more likely, but rather it is the correlation between them.¹² Therefore, the factors which may correspond to a criminal behaviour are each only a single discrete trait dependent on many others, capable of being dissected from the individual and made irrelevant.¹³ As will be described in later sections, this lack of individualization and context is of particular legal relevance

7 See Haggerty and Ericson, *Policing the Risk Society*.

8 See Mariana Valverde and Michael Mopas, "Insecurity and the Dream of Targeted Governance," in *Global Governmentality: Governing International Spaces* (Routledge, 2004), 233-50. Also, Sieber, "The New Architecture of Security Law – Crime Control in the Global Risk Society."

9 *Id.* at 245.

10 *Id.* at 243.

11 Jones, *Criminology*, pp. 93.

12 *Supra* Note 7.

13 Louise Amoore, "Data Derivatives; On the Emergence of a Security Risk Calculus for Our Times," *Theory, Culture & Society* 28, no. 6 (2011): 24-43. pp. 35. See also, Galic, Timan, and Koops, "Bentham, Deleuze and Beyond: An Overview of Surveillance Theories from the Panopticon to Participation" pp. 20.

in policing.¹⁴ Theoretically whether an individual may contain in his data profile a ‘guilty’ or ‘innocent’ status is only but one characteristic in determining whether there is a higher risk of criminal behaviour, based on the presence of other factors.¹⁵ The actuarial approach, which monitors the relationship between proxy data rather than individuals, may appease a public that demands both safety and privacy simultaneously,¹⁶ but it should raise red flags for criminal defenders. This essential quantification of right and wrong based on subjective factors and devoid of context is an initial inroad to bias in risk assessment.¹⁷

Finally, though mostly invisible to the public, the actuarial approach is more invasive than it may first appear. A data-based preventive system will inherently operate more effectively the closer it comes to having perfect information. The quest for full information necessitates the large-scale collection and use of personal and non-personal data, some of which may only be collected via covert or intrusive methods, prominently, “database policing”¹⁸ and algorithmic profiling.¹⁹ The information collected will also be retained for correlating data retroactively, drawing a temporal connection from presently innocent behaviour to potential future evidence.²⁰ As threats become more complex and our data more abundant, the calculation required to make risk assessments becomes more intricate and granular and its targets more concise.²¹ As Section IV will discuss, this ‘statistical, objective’ approach has important consequences on legal processes. The following section will first explain how the actuarial approach to crime is applied as assessing risk in predictive policing.

III. Predictive Policing

The practice of pairing the identification of likely risks with the active pre-emption of crime by police is the core function of predictive policing. With advanced calculating power, police may engage immense amounts of information in seconds to develop risk profiles for individuals or locations and target these subjects

14 For a discussion of surveillance, analogous to the argument on the piecemeal assessment of individuals in predictive policing see, Kevin D. Haggerty and Richard V. Ericson, “The Surveillant Assemblage,” *British Journal of Sociology* 51, no. 4 (December 2000): 605-22 at 610-612.

15 *Supra* Note 8 at 42.

16 *Supra* Note 5 at 27.

17 *Id.*

18 *Supra* Note 9 at 243.

19 European Agency for Fundamental Rights, “Preventing Unlawful Profiling Today and in the Future: A Guide,” Handbook (European Agency for Fundamental Rights, 2018) pp. 19.

20 *Supra* Note 14 at 29-30.

21 *Supra* Note 8 at 111.

for increased patrol and police interaction.²² Predictive policing has numerous definitions based on its particular uses; however, for the purposes of this article, predictive policing refers to *the use of historical and real time data to forecast²³ the risk that a location or individual is likely to be the center of a crime event, to which police agencies may choose how to purposefully divert their resources, in lieu of some other unknown threat.*²⁴ As established, this form of predicting risk identifies correlations between factors that together make crime likely. Ultimately, the risk assessments are ranked to identify those subjects in the highest risk categories, which become the subject of police interest.

Methods of predictive policing vary in function and degree of detail, predicated on the subject and level of analysis, and according to the technology used.²⁵ Generally, the broad categories of predictive analysis are assembled according to whether the goal of the prediction is to assess the risk of a crime by location, or as attributed to a particular, potential perpetrator.²⁶ One theory underlying most predictive policing operations posits that analysing environmental factors makes it possible to predict likely locations for crime, as crime is the result of “built-in” environmental features.²⁷ The most advanced methods of predictive policing build on derivative theories of crime mapping,²⁸ but allow for better

22 See Valverde and Mopas, “Insecurity and the Dream of Targeted Governance.”

23 Though forecast is a more scientific term for the analysis described herein (a method both reproducible and objective), prediction is the term utilized by law enforcement and the general body of literature. Therefore, there is no distinction to be inferred between the terms. See Walter L. Perry *et al.*, *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations* (Santa Monica, UNITED STATES: RAND Corporation, The, 2013), <http://ebookcentral.proquest.com/lib/unilu-ebooks/detail.action?docID=1437438>. at 1.

24 Wim Hardyns and Anneleen Rummens, “Predictive Policing as a New Tool for Law Enforcement? Recent Developments and Challenges,” *Eur J Crim Policy Res* 24 (October 23, 2018): 201-18.; see also Fieke Jansen, “Data Driven Policing in the Context of Europe, Working Paper” (DATAJUSTICE, May 7, 2018).; also Perry *et al.*, *Predictive Policing*; also Guthrie Ferguson, “Policing Predictive Policing” at 1125.

25 For a discussion on the terminology and differing types of analysis, see United States National Institute of Justice, “Crime Mapping & Analysis Program Extra Reading Material, Intermediate Crime Mapping Using ArcGIS 10.1,” May 29, 2016, <https://nij.ojp.gov/topics/articles/course-materials-crime-mapping-using-arcgis-101>.

26 Currently the most common purpose for predictive policing is for the prediction of crime by location. Though identification of individuals has been piloted in some jurisdictions, mainly in the US and UK, it has been met with decisive backlash for alleged violations of human rights.

27 Mara Hvistendahl, “Can ‘Predictive Policing’ Prevent Crime before It Happens?,” *ScienceMag.Org* (blog), September 28, 2016. See also, Kristian Lum and William Isaac, “To Predict and Serve?” (Royal Statistical Society, October 7, 2016), <https://rss.onlinelibrary.wiley.com/doi/full/10.1111/j.1740-9713.2016.00960.x>. at 18.

28 Crime mapping, or a “heat map,” is the spatiotemporal mapping of crime by location to identify where crime concentrates. Leslie Kennedy, Joel Caplan, and Eric Piza, “Risk Clusters, Hotspots, and Spatial Intelligence: Risk Terrain Modeling as an Algorithm for Police Resource Allocation Strategies,” *J Quant Criminol*, 2011, 339-62. See Perry *et al.*, *Predictive Policing* at 46-50. See also Spencer Chainey, Lisa Tompson, and Sebastian Uhlig, “The Utility of Hotspot Mapping for Predicting Spatial Patterns of Crime,” *Security Journal* 21 (2008): 4-28.

precision through the addition of new data points assessed and organized by AI enhanced software. Sophisticated crime mapping systems²⁹ function on a multi-dimensional modelling system to provide an “abstraction of the real world.”³⁰ A model is composed of an area map which is parcelled into small cells of a set dimension and assessed for the “presence, absence, or intensity of qualities,” that is any temporal, social, physical, or behavioural factors that may contribute to crime.³¹ The presence of each particular quality is measured on a single layer of the map, the layers are then stacked over one another to provide a multi-dimensional map that identifies high-risk areas for crime events based on the comingling of measured qualities.³² These data sets are informed by quantifiable physical and social factors as general as weather and population density, and range to socio-economic markers such as the location of publicly subsidized housing or the homes of known prior offenders.³³

With larger inputs of data, it is possible to get an increasingly closer view of “built-in” opportunities for crime that reflect relevant environmental factors, enabling the micro-targeting of crime hot-spots, for instance narrowing risk to a particular building rather than full city block. All of the relevant theories generally hold that by identifying the environmental factors that constitute opportunities or drivers of crime, it may theoretically be preventable.³⁴ For instance, if a particular location, known for its pubs and twenty-four hour convenience store, is designated as high risk for violent crime, police may prioritize patrols in the area. Proponents of a social justice-oriented approach prudently propose that rather than use this information to target crime, it instead be used to improve the systemic issues that make a location a more likely target for crime.

The theories underlying predictive policing are generally accepted as regards soundness of logic and effectiveness. However, with the increased capabilities accompanying the use of AI which allow the automatic processing of data by

29 For additional analytical modelling techniques, see “Geographic Information Systems and Predictive Policing Application Note” (US Dept. of Homeland Security Science and Technology, August 2013). See also, Rohan George, “Predictive Policing: What Is It, How It Works, and Its Legal Implications,” *The Centre for Internet & Society Blog* (blog), November 24, 2015. Also, Guthrie Ferguson, “Policing Predictive Policing” at 1135.

30 Kennedy, Caplan, and Piza, “Risk Clusters, Hotspots, and Spatial Intelligence: Risk Terrain Modeling as an Algorithm for Police Resource Allocation Strategies.”

31 *Idem*.

32 “Geographic Information Systems and Predictive Policing Application Note.” at 1.

33 See Weisburd, “The Law of Crime Concentration and the Criminology of Place” also Perry *et al.*, *Predictive Policing*.

34 For a more in-depth discussion of the statistical methods that are used for crime mapping, see Perry *et al.*, *Predictive Policing*; also George, “Predictive Policing: What Is It, How It Works, and Its Legal Implications.”

algorithms, that predictive policing has advanced very quickly. An algorithm may be defined as a “finite sequence of precise instructions that are implementable on computing systems” and by which data are assessed.³⁵ In order for the algorithm to attribute relative value to the data it is provided with, it is necessary that it has been trained on a human coded model³⁶ which will indicate to the system the relative value of data points.³⁷ A model must be built to represent the universe for which a risk assessment is intended, according to all known elements and relationships.³⁸ The algorithm applies meaning and value to new, incoming data, based on the inferences drawn from the model.³⁹ It may therefore be inferred that models and their constituent data are not universally applicable.

Many predictive policing software programs equipped with AI also have the ability to use machine learning, meaning that an algorithm can autonomously adapt its entire model in accordance with new data points.⁴⁰ As all new relevant data are assessed for value and become a part of the model, the algorithm also subsequently adapts to reflect the new model, in essence re-coding itself.⁴¹ Therefore, the predictive function is perpetually rebuilding itself as it learns. This automated or semi-automated process of discovering patterns and their relative distributions⁴² is based on data mining; the process of searching and sorting electronically stored data to generate new information.⁴³ Though it is possible to have too much data, the machine learning function is also generally adept at discarding irrelevant or ‘noisy data.’⁴⁴ Much of the discussion on biases in risk assessment focuses on human error and subjectivity. However, many biases are self-learned by the system, due to its ability to autonomously make complicated inferences and adjust its model. Just as humans add subjectivity in coding the original metric for data value, indirect subjectivity may be inferred by a machine learning system over a short series of calculations.⁴⁵

35 Osoba and Welser IV, *An Intelligence in Our Image* at 4.

36 *Supra* Note 12.

37 Cathy O’Neil, *Weapons of Math Destruction* (New York: Crown, 2016).

38 *Id.* at 18-20.

39 Pasquinelli, “How a Machine Learns and Fails – a Grammar of Error for Artificial Intelligence” at 5.

40 Tzu-Wei Hung and Chun-Ping Yen, “On the Person-Based Predictive Policing of AI,” *Ethics and Information Technology*, June 1, 2020.

41 Jessica Gabel Cino, “Deploying the Secret Police: The Use of Algorithms in the Criminal Justice System,” *Georgia State University Law Review* 34, no. 4 (2018): 1073-1102. *See also* Osoba and Welser IV, *An Intelligence in Our Image* at 5.

42 *Supra* Note 40 at 4.

43 Witten and Frank at 5.

44 Marco Mendola, “One Step Further in the ‘Surveillance Society’: The Case of Predictive Policing,” *Leiden University Tech and Law Center*, October 2016.

45 Mikhail Reider-Gordon *et al.*, “Artificial Intelligence, Predictive Analytics, and Unlawful Discrimination.”

The foregoing summarized the predictive analysis function of predictive policing, whereas the actionable portion is more akin to traditional policing. Police may act on a risk assessment via increased patrols (allocating unassigned time to designated locations or using the time between calls for assistance), increasing visible presence, and interacting with the community.⁴⁶ Using the results of a risk assessment, police may choose to monitor particular areas or people meeting specific profiles, so to ensure that resources are devoted to the most likely sources of crime. Though both prediction and action leave sufficient room for error, the remainder of this article will address the potential legal effects that are created by the predictive analysis, or risk assessment, function.

IV.1 Operational Risks

Few would argue that the prevention of crime is against our collective interest, even if it requires that governments extend police discretion. Traditional policing generally follows the harm principle, in which power is rightly exercised when it prevents harm by one against another.⁴⁷ This concept is apparent when exceptional police action may be taken to thwart reported or observed acts of violence. In contrast, predictive policing seeks to eliminate potential future crime and action is justified by a threshold probability of a crime's occurrence. This preventative approach is much more akin to the precautionary principle, which generally applied to environmental law but more recently also to counter-terrorism, states that the absence of concrete certainty of an event's occurrence cannot alone justify inaction.⁴⁸ Applied to criminal law, the principle would dictate that preventative action against potential crime may be justified in the absence of imminent or catastrophic threat. Unlike the direct cessation of imminent harm, this notion of acceptable pre-emption may be seen as a justification for predictive policing.

An important caveat to the application of the harm principle however, is that in attempting to pre-emptively mitigate violence, new risks are created as a consequence.⁴⁹ An example from the environmental context would be an overly

46 See Perry *et al.*, *Predictive Policing at 57*; also Hardyns and Rummens, "Predictive Policing as a New Tool for Law Enforcement? Recent Developments and Challenges."

47 See *Supra* Note 5.

48 Matthias Borgers and Elies Van Sliedregt, "The Meaning of the Precautionary Principle for the Assessment of Criminal Measures in the Fight Against Terrorism," *Erasmus Law Review* 2, no. 2 (2009): 171-95.

49 *Id.*; Also *Supra* Note 8. For a discussion on the appropriateness of applying pre-emptive risk mitigation in the context of criminal law, see Anna-Maria Getos Kalac, "Guilt, Dangerousness and Liability in the Era of Pre-Crime – the Role of Criminology? To Adapt, or to Die, That Is the Question!" (Biannual Conference of the Scientific Association of German, Austrian and Swiss Criminologists, Vienna, 2020).

restrictive curb on pollution which as a result also limits the prolificacy of life-supporting industry. This section will argue that to prevent crime via predictive policing, the greatest manufactured risk is the potential infringement of individual legal interests by police. The paper distinguishes a 'traditional' criminal investigation, one which commences following the commission of a crime, from a preventative investigation, which will be defined as the use of predictive analysis to anticipate and prevent future crime. The distinction is critical as with the onset of a traditional investigation particular protections are automatically triggered onto the suspects or subjects of the investigation to counterbalance potential intrusions by the state. These protections may include access to information and an attorney; formalized evidentiary collection methods; and the protection of privacy.

Currently the concept of criminal investigation does not generally include the use of preventative investigatory measures and therefore suspects are not conferred the commiserate legal protections. The remainder of this article will address these protections in the context of crime prevention and posit that the effect of preventative investigations without them is an adverse effect, or manufactured risk, of predictive policing. Namely, the legal protections to be addressed are the standard of reasonable suspicion, the presumption of innocence, and prohibition on discriminatory treatment. The article will conclude in arguing that in addition to extending these safeguards to preventative investigations, they must also be adapted to accommodate the realities of using advanced technology for policing.

IV.2 The Standard of Reasonable Suspicion

In traditional criminal investigations, the standard of reasonable suspicion (standard) is a legal protection provided citizens against arbitrary deprivations of liberty by requiring that a police intervention is justified.⁵⁰ Formulating the standard in real time is required of police officers to justify an interaction with individuals either during a criminal investigation or in the course of a routine patrol for reasons that include the observance of irregular behaviour or on the basis of more advanced information. This standard is important not only at the time of initial police contact, but it also ensures a fair, future trial as the state must present an articulable argument for the arrest in court, which the charged individual will then have the opportunity to rebut.⁵¹ Though the principle of preventative investigation does not necessarily preclude the standard, the use of algorithmic risk

50 David Lyon, *Surveillance As Social Sorting, Privacy, Risk and Digital Discrimination*, 2002 pp. 252-261.

51 Marianne F.H. Hirsch Ballin, *Anticipative Criminal Investigation: Theory and Counterterrorism Practice in the Netherlands and the United States* (T.M.C. Asser Press, 2012).

assessments makes enforcing the standard less straightforward. This sub-section will highlight the ways in which AI as a policing tool interferes with the ability to provide an articulable, individualized suspicion, potentially compromising the proper application of the standard.⁵²

The standard of reasonable suspicion requires that police officers who are engaged in the stop and/or arrest of an individual must rely on the existence of “facts or information which would satisfy an objective observer that the person concerned may have committed the offence,” based on all known circumstances.⁵³ Reasonable suspicion in good faith alone is insufficient but rather the standard requires that a specific and concrete offence has or is occurring and there is reason to suspect the subject individual is implicated in its commission.⁵⁴ Therefore, inexact notions that do not provide an identifiable instance of crime but instead a blanket indicator of general harm are insufficient.⁵⁵ An example of a blanket prediction may be only the vague warning that violence may occur, with no reasonably actionable information. Risk assessments provide the probability of crime as calculated on unseen data, which gives a general indication that crime is more or less likely as compared to elsewhere, for instance as in the designation of a ‘high crime’ area.⁵⁶ Therefore, a risk assessment which finds it forty percent likely a robbery will occur in a particular neighbourhood may be considered little other than predicting a general harm is more likely here than there, with no clear nexus to an individual or specific act.⁵⁷ This may warrant increased patrols in an area, but will do little in supporting a reasonable suspicion justification for the stop of any given individual in the area.⁵⁸ Without properly specific information it may then be the case that any individual carrying a duffel bag in the hypothetical neighbourhood, not a suspicious behaviour, could be viewed as suspicious according to the assessment. Police stops predicated on

52 The arguments provided will be applicable in both European and American jurisdictions, and are intended to be general, despite a large body of literature on predictive policing and risk assessments in the US context.

53 *Supra* Note 45 at 13, citing *Ilgar Mammadov v. Azerbaijan*, no. 15172/13, 22 May 2014, p. 21 at §88. See also Barrett, “Reasonably Suspicious Algorithms: Predictive Policing at the United States Border” at 331.

54 Article 5(1)(c) of the European Convention on Human Rights.

55 *Supra* Note 45 at 14.

56 The Supreme Court of the United States has held that the designation of a ‘high crime area’ may form an important part of the reasonable suspicion analysis. Andrew Guthrie Ferguson, “Crime Mapping and the Fourth Amendment: Redrawing ‘High-Crime Areas,’” *Hastings Law Journal* 63, no. 1 (2011): 179-232 at 199-200, citing *Illinois v. Wardlow*, 528 U.S. 119 (2000).

57 *Supra* Note 14.

58 Rosamunde van Brakel and Paul De Hert, “Policing, Surveillance and Law in a Pre-Crime Society: Understanding the Consequences of Technology Based Strategies,” *Cahiers Politiestudies Jaargang 3*, no. 20 (2011): 163-92 at 166.

such vague information are clearly deficient vis-à-vis the standard in terms of both a recognizable crime as well as identifiable persons.

The issue of properly meeting the standard is a generally vexing one, often left to a case by case analysis, as no two situations are exactly alike. Police intervention should not be predicated on a risk assessment nor profile alone, but should be included as a part of the officer's situational awareness.⁵⁹ The standard dictates that police must "be able to point to specific and articulable facts which, taken together with rational inferences from those facts, reasonably warrant" a stop.⁶⁰ Therefore, in addition to suspicion of the nexus between an identified crime and individual, the individual behaviour must warrant suspicion in light of the full context.⁶¹ Each relevant facet of the circumstances must corroborate the officer's suspicion as appropriately balanced in light of other factors.⁶² In using a risk assessment as a corroborating fact this is especially important, as neither the calculations leading to the assessment nor the input data are known to the officer.⁶³

In the above hypothetical, the possession of a duffel bag alone is not suspicious. In order to use this risk assessment as a part of justifying the intervention, other factors must corroborate the officer's reliance, such as behaviour irregular for someone walking on the street.⁶⁴ If an officer relies on this general risk assessment alone, anyone carrying a bag in this neighbourhood may be considered suspicious and the suspicion is not particularized to a certain individual or particular profile.⁶⁵ This would obviously lead to negligent policing at best, and at worst end in the violation of numerous individuals' rights. Because predictive policing is the inherent pursuit of preventing crime that is anticipated but has not yet occurred, tools as powerful as a risk assessment should not be discarded, however due care must be used so their use adheres to legal standards.⁶⁶

59 Guthrie Ferguson at 287 citing *Alabama v. White*, 496 U.S. 325, 330 (1990).

60 Andrew Guthrie Ferguson, "Predictive Policing and Reasonable Suspicion," *Emory Law Journal* 62, no. 259 (2012): 261-325 at 286 citing *Terry v. Ohio*, 392 U.S. 1, 21-22 (1968), which sets the standard of reasonable suspicion for a police stop.

61 Andrew Guthrie Ferguson, "Big Data and Predictive Reasonable Suspicion," *University of Pennsylvania Law Review* 163, no. 2 (January 2015): 327-410 at 287.

62 Kiel Brennan-Marquez, "'Plausible Cause': Explanatory Standards in the Age of Powerful Machines," *Vanderbilt Law Review* 70, no. 4 (2017): 1249-1301. See also Guthrie Ferguson, "Crime Mapping and the Fourth Amendment: Redrawing 'High-Crime Areas'" at 207.

63 Danielle Kehl, Priscilla Guo, and Samuel Kessler, "Algorithms in the Criminal Justice System: Assessing the Use of Risk Assessments in Sentencing," Responsive Communities Initiative (Berkman Klein Center for Internet & Society, Harvard Law School, July 2017), <http://nrs.harvard.edu/urn-3:HUL.InstRepos:33746041> at 28.

64 *Supra* Note 62 at 326. See also *Supra* Note 61 at 287.

65 *Supra* Note 63 at 1263.

66 *Supra* Note 45 at 14 citing *Guzzardi v. Italy*, no. 7367/76 6 November 1980 at p. 35, §102.

Finally, while adherence to the standard must be strict, it does not necessarily need to meet the degree of specificity sufficient for an arrest.⁶⁷ The retroactive accounting for a police officer's actions is critical to the trial process and as stated at the beginning of this section, necessary for the defendant to challenge his charge.⁶⁸ The use of AI and increased amounts of information makes it much easier for an officer to justify a reasonable suspicion analysis retroactively and it seems likely that a court will adopt the officer's correct supposition based on untimely information over a defendant's unprovable claim that the data was only later accessed.⁶⁹ As in the hypothetical, the use of a general prediction of burglary to indiscriminately stop thirty individuals carrying duffel bags, to only later learn that the thirty-first individual had an outstanding arrest warrant for burglary, could not retroactively justify his stop as a result of reasonable suspicion. As in all investigations, if the proper weight is afforded to observed behaviours and context, and AI is used as supplemental information, this risk should be manageable.

The foregoing endeavoured to show that the prevention of crime is not facially inconsistent with applying the standard of reasonable suspicion, as any criminal investigation relies on some degree of probability and officer discretion.⁷⁰ However, this section has aimed to illustrate that though AI is an invaluable tool for predictive policing, it must be used as a supplement to forming reasonable suspicion, rather than the foundation of police interaction. Though few courts have addressed the application of the reasonable suspicion standard to predictive policing, it is clear that it will be highly case-specific and the use of AI for policing must be tailored to fit the existing standard. The following sub-section will similarly demonstrate that the use of AI in the initial phases of risk assessments can also affect legal outcomes of policing.

IV.3 The Presumption of Innocence

The presumption of innocence is a corner stone of criminal law and may be found in most international, regional, supranational, and national covenants.⁷¹

67 *Murray v. The United Kingdom*, no. 14310/88 (October 28, 1994).

68 Barrett, "Reasonably Suspicious Algorithms: Predictive Policing at the United States Border" at 331.

69 Ferguson, "Big Data and Predictive Reasonable Suspicion" at 341-343.

70 *Supra* Note 52 at 252.

71 See Article 6(2) of the European Convention on Human Rights for the right to the presumption of innocence. The presumption is found as statute and case law in the United States, best articulated by *Taylor v. Kentucky*, 436 U.S. 478 (1978); Article 11(1) Universal Declaration of Human Rights; and Article 14(2) International Covenant on Civil and Political Rights.

Though it is usually strictly interpreted as applying to the pre-trial and trial phases of a criminal proceeding, it has a larger social and moral relevance.⁷² The presumption stipulates that a charged party be treated as innocent until adjudged by a tribunal and proven otherwise, and that the entire criminal process be conducted accordingly to ensure the impartiality of the proceedings.⁷³ Because a charge *prima facie* implies that the charging authority, usually the police or prosecutor, has reason to suspect the individual is guilty, the presumption is a legal fiction intended to protect the impartiality of the trial rather than an actual inference of no factual wrongdoing.⁷⁴ Upholding the presumption is intended to ensure the equality of arms⁷⁵ between parties, recognizing that the ability of the state as moving party to make a case is often stronger than an individual due to its capacity to investigate, prosecute, and sentence.⁷⁶ Though the presumption is generally considered to apply only after a charge has been issued, this section will argue that its application is also highly relevant to the prevention of crime. If predictive policing is the actionable risk assessment of future crime, any stop or arrest will be initially predicated on the anticipation of future guilt. The clear implication being that there generally can be no equality of arms between the charging authority and an individual who is required to defend himself against a charge of future culpability.

The respective placement of crime prevention as prior to a crime's commission, and issuance of a criminal charge as beginning the criminal justice process, allows that the presumption is not triggered in the act of predictive policing. However, despite this, it is the very nature of preventive investigations that the actionable anticipation of crime also implies the actionable anticipation of guilt, this being the inverse of the presumption of innocence.⁷⁷ This article will not

72 Antonella Galetta, "The Changing Nature of the Presumption of Innocence in Today's Surveillance Societies: Rewrite Human Rights or Regulate the Use of Surveillance Technologies?," *European Journal of Law and Technology* 4, no. 2 (2013).

73 *Supra* Note 52 at 548; See also Elies Van Sliedregt, "A Contemporary Reflection on the Presumption of Innocence," *Revue Internationale de Droit Penal* 80, no. 1 (2009): 247-67 at 249.

74 Liz Campbell, "Criminal Labels, The European Convention On Human Rights And The Presumption of Innocence" (University of Edinburgh School of Law Research Paper Series, 2012) at 16. See also Ferry de Jong and Leonie van Lent, "The Presumption of Innocence as a Counterfactual Principle," *Utrecht Law Review* 12, no. 1 (January 2016): 32-49 at 34.

75 Equality of arms refers to the requirement that a defendant must be afforded full procedural equity with the prosecution. See *Pataki & Dunshirm v. Austria*, App. No. 596/59 and 789/60, report of 28 March 1963, *Yearbook Volume 6, 1963*. Also Gordana Buzarovska, "Interpretation of 'Equality of Arms' in Jurisprudence of Ad Hoc Tribunals and ICC," *SEEU Review* 11, no. 1 (2015): 28-39.

76 Andrew Ashworth, "Four Threats to the Presumption of Innocence," *The International Journal of Evidence & Proof* 10 (2006): 241-79 at 249-250.

77 In comparing Article 5 of the European Convention on Human Rights to the presumption, Ashworth questions the legality of pre-trial detention in the case of exceptional powers granted in the prevention of terrorism. As he determines the need for strong terrorism prevention may weigh strongly in favor of reason-

delve into the grey area between guilt and innocence. However, it will instead posit that by attributing guilt for future, potential crimes based on the commission of past crimes, predictive policing may violate the presumption. In most presently available predictive policing software, and even prior to the integration of AI, recidivism or the previous commission of a crime is generally perceived as a likely indicator of future crime.⁷⁸ Therefore, an individual with a criminal record, regardless of the disposition of the charge, will be at a statistically higher risk of future guilt. Even those who previously were acquitted or served a full sentence, may be found as high risk due to their criminal record. This is a clear violation under the strict interpretation of the presumption.⁷⁹ This section will describe the practice in predictive policing that, in reliance on police records to help form future risk assessments, may lead to violations of the presumption of innocence against those wrongly accused as well as those whose criminal sanctions have been fulfilled.

Predictive analyses rely heavily on static crime statistics such as arrest records, calls for assistance, or non-custodial stops.⁸⁰ The maintenance of records varies by department, down to the detailed way in which an officer inputs data. Police may choose to record every interaction or only those in which there is an arrest. Some departments may have a culture or policy of over- or under-reporting crime to meet particular quotas, or may be selective in the types of crimes they report.⁸¹ Similarly, not all crimes are reported equally. Some departments may only include calls for assistance, rather than arrests. However, perhaps most pertinent to the arguments below, crime records, regardless of how they are recorded, are almost always static.⁸² That is, once an arrest is made or a charge filed, no future act will change the status of its historical record, as opposed to one's employment status for instance, which can change many times over the course of a lifetime. Unlike the fastidious record keeping of the criminal justice system, the fact that one was briefly unemployed thirty years ago is of

able pre-trial detention, this still raises questions of the presumption. Analogizing this argument to predictive policing may produce a weaker case for derogating from the presumption due to the weight of potential harms. See Ashworth.

78 See *Supra* Note 64.

79 "The presumption of innocence does not have any cognitive pretensions but prescribes the hypothetical starting point of due process." Van Sliedregt, "A Contemporary Reflection on the Presumption of Innocence" at 264.

80 See Lum and Isaac, "To Predict and Serve?" Also, Jeffrey Brantingham, Matthew Valasik, and George Mohler, "Does Predictive Policing Lead to Biased Arrests? Results From a Randomized Controlled Trial," *Statistics and Public Policy* 5, no. 1 (2018): 1-6.

81 See P. Jeffrey Brantingham, "The Logic of Data Bias and Its Impact on Place-Based Predictive Policing," *Ohio State Journal of Criminal Law* 15 (2018): 473-86.

82 Perry *et al.*, *Predictive Policing* pp 92. Also Guthrie Ferguson, "Policing Predictive Policing" pp. 1148-1149.

little value. Therefore, for the purposes of predictive policing, it is entirely plausible that a decade-old arrest may be as relevant to a risk assessment as a month-old conviction.⁸³

Similarly, many systems record stops or police interactions uniformly regardless of outcome. An officer's good faith reliance on his suspicion regarding a particular crime which may or may not occur in the future, *de facto* means that the stopped individual is innocent at the time of the intervention and setting of the record. However, the record of this stop may still be included in the data used for future risk assessments. Based on the record of this interaction, the individual may be assessed at a higher risk level the next time he encounters a police officer.⁸⁴ Even though no wrong was committed, the officer is likely unaware of the reasons for which the predictive analysis targets the individual as fitting the profile of a past offender; however, it may form part of his suspicion and justify an additional stop. This process is referred to as a feedback loop.⁸⁵ Here it is already clear that though a preventive police intervention does not necessarily indicate one's guilt, the officer's inclination to stop the individual rather than someone else on the basis of a risk assessment implies that the individual is statistically more likely than another to be considered potentially guilty based on the fact he has been stopped in the past.

This form of heightened police scrutiny is especially true for prior offenders, those with prior arrests or convictions, who are often considered to form a large contingent of potential offenders when included in a typical risk assessment.⁸⁶ It must be acknowledged that the factors driving this could be either the initial drivers toward crime, such as low socio-economic status or frequent contacts with police, or, as in particular jurisdictions, the formal profiling of previous offenders.⁸⁷ However, it is fairly clear that due to the static nature of criminal records if an individual is arrested and charged on a crime, this will always be an important component of a risk assessment.⁸⁸ Even were we to find the perfect risk assessing algorithm which properly ranked individuals according to actual risk level, it is difficult to believe that any assessment system built on relative values can be fair and accurate for all, when a weighted comparison will always value the prior

83 This is an analysis of the processes and functions at a basic level. Some predictive software or even police databases may operate to higher and varying degrees of sophistication vis-à-vis the regular updating of information.

84 Dean Wilson, "Algorithmic Patrol," in *Big Data, Crime and Social Control*, 2017 pp. 2.

85 Law Society Commission on the Use of Algorithms in the Justice System and The Law Society of England and Wales, "Algorithms in the Criminal Justice System" (United Kingdom: The Law Society, June 2019) pp. 35.

86 See *Supra* Note 64.

87 *Idem*.

88 *Idem*.

offender as a higher relative risk. Therefore, this article argues that relying on data for prior crime may allow the inference that an individual who was charged but later acquitted will be algorithmically processed identically to one charged and found guilty, all other factors constant. This not only places the individual in the grey area between innocence and guilt, but also violates the presumption even in its strict interpretation.⁸⁹

The ECHR has held that the presumption of innocence applies to an individual who has been acquitted of a crime,⁹⁰ including the prohibition on passive utterances of suspicion following an acquittal as well as formal acts which indicate a refusal to accept one's innocence.⁹¹ It should therefore follow that a future stop by police predicated in part on a past charge subsequently acquitted, were the motivation able to be proven, violates the presumption.⁹² Regarding the use of information in a law enforcement database, in *S. and Marper v. the United Kingdom*, the Court avoided applying the presumption to the retention of biometric information of acquitted parties. However, the Court held that to be treated as guilty after having been cleared of an offence leads to a presumption against innocence and risks stigmatization.⁹³ Even more importantly, the Court found that allowing the inclusion of acquitted individuals in a DNA database unfairly "enlarges the category of 'suspect.'"⁹⁴

Unlike the retention of DNA data, the value of which comes from proactive querying, the autonomous and constant correlation of arrest records to determine "propensity to commit harmful behaviour" exceeds the intrusiveness assessed by the Court in *Marper*.⁹⁵ As an active practice, predictive policing would also be considered as constituting a formal act per the ECHR.⁹⁶ An officer who then takes concrete action in partial reliance on the results of an algorithmic risk assessment clearly is acting beyond the bounds of a tacit suspicion.⁹⁷ It is argued here that were the Court in *Marper* to address the automatic and indiscriminate searching of DNA samples for forming pre-emptive suspicion, as in predictive policing, it may have reached an expanded interpretation of the

89 See *Supra* Note 45.

90 *Supra* Note 73 citing *Sekanina v. Austria*, No. 13126/87, August 25, 1993.

91 See Campbell, "A Rights-Based Analysis of DNA Retention" at 7. *Also Supra* Note 73.

92 *Supra* Note 75 at 5-6, 21-23.

93 *Supra* Note 45 at 15.

94 The ECHR has referred to this as the 'pérennisation de la catégorie de "suspect",' see Galetta, "The Changing Nature of the Presumption of Innocence in Today's Surveillance Societies: Rewrite Human Rights or Regulate the Use of Surveillance Technologies?"

95 *Supra* Note 75 at 25. See also, *Supra* Note 45 at 15.

96 *Supra* Note 92.

97 *Supra* Note 93.

presumption. Even with the outcome of *Marper*, it is well established that this type of “evidence-based” stigmatization⁹⁸ extends well beyond the criminal justice system into applications for jobs, housing, and credit. In the case of policing, stigmatization may extend to whole communities.⁹⁹

Though the presumption is traditionally tied to pre-trial and trial processes for charged individuals, the use of crime data for enhanced policing methods requires rethinking its wider application outside the trial process. This sub-section argued that as a preliminary matter, the use of AI for processing data used in predictive policing relies on categories of data that imply culpability at the peril of incorrectly finding previously acquitted individuals to be a high risk for recidivism. This clear violation of the presumption of innocence sheds light on the imperfect means by which risk assessments are constructed and highlights the need for reforming prevention practices to bring them into line with the legal protections due individuals. The final sub-section will similarly address the ill-effects of using AI to create profiles in crime prevention, at the risk of discriminatory treatment.

IV.4 Discrimination & Profiling

The prohibition on discrimination (prohibition) is a generally accepted principle of law, in Europe enshrined in Article 14 of the European Convention on Human Rights. As established above, risk assessments are built upon an analysis of factors that are subjectively determined by humans to be relevant to the risk of crime. Therefore, like more traditional policing methods, it is impossible to completely rule out human bias or error.¹⁰⁰ However, due to the machine learning nature of algorithms, several additional forms of bias may be present in risk assessments. Unintentional bias, either of human origin or machine generated, may go undetected by the users of risk assessments, whereas in traditional investigations there should be some indication or record of discriminatory behaviour. In addition, because of the opacity of AI generated risk assessments it may be nearly impossible for an individual to satisfactorily prove that police actions against him violated the prohibition on discrimination. This section will describe the formation

98 Gstrein, Bunnik, and Zwitter, “Ethical, Legal and Social Challenges of Predictive Policing” at 10.

99 It is well acknowledged that in the United States’ system a conviction is followed by numerous adverse legal consequences beyond custody, including ineligibility for benefits, student loans, and public housing; as well as social stigma and segregation. Courts have deemed these as civil consequences apart from the criminal punishment and therefore “collateral.” See David Wolitz, “The Stigma of Conviction: Coram Nobis, Civil Disabilities, and the Right to Clear One’s Name,” *Brigham Young University Law Review*, no. 5 (2009): 1277-1340 at 1310-1315.

100 Bias has several definitions. This article refers to bias as “prejudice” or “intentional discrimination.” Andrew Selbst, “Disparate Impact in Big Data Policing,” *Georgia Law Review* 52 (2017): 109-95 at 125-126.

of risk assessments per the use of algorithmic profiling, the preferred method of predictive policing. It will then highlight the potential for discriminatory practices and violations of equal treatment inherent in its use, arguing that current practices and available remedies are not consistent with the prohibition.

Predictive policing is essentially a sophisticated form of traditional criminal profiling, generally defined as a technique by which information is processed to identify and correlate patterns to infer unknown or unobservable information about an individual or groups.¹⁰¹ For instance, the factors that may make a particular crime more likely, accessibility of a victim, motivation for crime, lack of target guardian, etc., in fact form the locational profile for an anticipated crime of theft.¹⁰² In applying environmental factors to fill out the profile for theft, an ideal location may include the constant flow of dense crowds in a train station, where several dimly lit passages are not covered by CCTV.¹⁰³ Clearly, a general criminal profile may be constructed heuristically without complex technology or data. In adding a degree of sophistication to this method, algorithmic profiling is “based on the use of data stored in databases and information technology systems... us[ing] different techniques to profile people based on correlations and patterns in data.”¹⁰⁴ Algorithmic profiling uses the “statistical aggregation” of information to detect trends or patterns that may inform statistically accurate profiles of future crime, rather than relying on causation linked to a particular ‘profile’ as in the profile for theft sketched above.¹⁰⁵

The difference between the traditional and algorithmic profiles is largely the amount of data and the ability to process it quickly and by advanced methods. Comparing the use of a profile pre- and post-crime, a traditional profile has the benefit of analysing an identifiable crime by which evidentiary factors may be accrued and built, whereas in the case of predictive policing, there is no

101 European Agency for Fundamental Rights, “Understanding and Preventing Discriminatory Ethnic Profiling: A Guide,” Towards More Effective Policing (Brussels: European Agency for Fundamental Rights, 2010) at 9. See also van Brakel and De Hert, “Policing, Surveillance and Law in a Pre-Crime Society: Understanding the Consequences of Technology Based Strategies”, p. 173.

102 Hvistendahl, “Can ‘Predictive Policing’ Prevent Crime before It Happens?” For an in-depth explanation see also Perry *et al.*, *Predictive Policing*. For an early study on the linkage between crime and environment, see Robert Park, Ernest W. Burgess, and Roderick D. McKenzie, *The City* (University of Chicago Press, 1925). Also, Nina Brown, “Robert Park and Ernest Burgess: Urban Ecology Studies, 1925” (Center for Spatially Integrated Social Science UC Santa Barbara, 2002).

103 John Eck and David Weisburd, “Crimes Places in Crime Theory,” *Crime and Place: Crime Prevention Studies* 4 (July 12, 2015): 1-33.

104 European Agency for Fundamental Rights, “Preventing Unlawful Profiling Today and in the Future: A Guide,” Handbook (European Agency for Fundamental Rights, 2018) at 19.

105 Yves Poulet, “Data Protection Webinar 2: Profiling” (Webinar, Council of Europe Directorate General Human Rights and Rule of Law Data Protection Series, Brussels, July 14, 2020), https://www.youtube.com/watch?v=8qHO_DhpDbg&feature=youtu.be&fbclid=IwAR1Q4mVJjUvu8G9wdjMyLqIrUzP0Hn3JLCTqXso2Ev684W_D6VAFJg8D4kw.

actual crime and therefore probabilistic correlations of proxy data provide the best available assessment. In contrast to the heuristic formulation of a profile, algorithmic profiling is the indiscriminate use of seemingly unrelated data to form inferences about yet unknown events without context. Though a profile may be a particularly effective investigative tool, especially for predictive analysis, the absence of context makes it operationally less exact.¹⁰⁶ This may make parsing a profile for single traits more likely, such as indicators of race, gender, etc.,¹⁰⁷ which is unlawful and indicates discrimination, leading to the derogatory use of the term 'profiling'.¹⁰⁸ As in forming a reasonable suspicion, the added benefit of context is apparent.

Similarly, the use of an assessment reliant on probability and proxy data for profiling in crime prevention is especially problematic. A profile generated by statistical regression, for instance, is likely too general to be accurate for the majority of the population.¹⁰⁹ For instance, if a profile correctly predicts that one in five men of a particular race is likely to commit burglary by a certain age, four out of five men in the profile are innocent.¹¹⁰ This demographic subgroup may be treated disproportionately to the full population in a way that is not representative of reality.¹¹¹ Though simplistic, the hypothetical makes clear that even when properly used by police, this non-specific form of profiling may promote a type of unintentional bias which leads to discrimination.

Discrimination is differential treatment toward an individual or group based on illegitimate grounds¹¹² such as sex, race, colour, ethnicity, religion, and social

106 European Agency for Fundamental Rights, "Understanding and Preventing Discriminatory Ethnic Profiling: A Guide" at 59.

107 European Commission against Racism and Intolerance, Combating Racism and Discrimination in Policing, ECRI General Policy Recommendation No. 11, (2007) <<https://rm.coe.int/ecri-general-policy-recommendation-no-11-key-topics-combating-racism-a/16808b7639>>

108 Though legitimate when properly used, profiling often means the targeting of individuals by visible traits, namely race. See Ric Simmons, "Quantifying Criminal Procedure: How to Unlock the Potential of Big Data in Our Criminal Justice System," *Michigan State Law Review*, 2016, 947-1017 at 971-972. In the United States, the Equal Protection Clause stipulates that for race to be a valid consideration, it must be for a necessary and narrowly tailored use which achieves a compelling state interest.

109 Dirk Brand, "Algorithmic Decision-Making and the Law," *EJournal of EDemocracy* 12, no. 1 (2020): 115-32 at 123. Also *Supra* Note 45; For a discussion on linear discussion, see also University of Helsinki and Reaktor, "Elements of AI, How Should We Define AI?," Online course, 2020.

110 Simmons, "Quantifying Criminal Procedure: How to Unlock the Potential of Big Data in Our Criminal Justice System" at 984.

111 Council of Europe Committee of experts on internet intermediaries, "Algorithms and Human Rights, Study on the Human Rights Dimensions of Automated Data Processing Techniques and Possible Regulatory Implications," 2017 at 15.

112 European Agency for Fundamental Rights, "Understanding and Preventing Discriminatory Ethnic Profiling: A Guide" at 15-16, citing Council Directive 2000/43/EC Implementing the principle of equal treatment between persons irrespective of racial or ethnic origin, OJ(L) 180, Article 2.

origin, whereas another in similar circumstances is not so treated.¹¹³ Unlawful profiling based on an illegitimate ground may be the result of both direct or indirect discrimination.¹¹⁴ Direct discrimination is the knowing and purposeful differential treatment toward a group, often as the result of a particular policy. Arguably it is the most obvious manifestation of bias, as it is the stated rationale for a behaviour and should be easily traceable. In addition to being theoretically apparent, seeking legal remedy for instances of direct discrimination is relatively easier to prove. Though initially straightforward-seeming, direct discrimination may lead to stereotyping or practices that prioritize efficiency at the cost of unlawful presumptions of guilt. Often direct and indirect discrimination blend in practices that become culturally imbedded and the discriminatory behaviour may no longer be only a matter of formal policy.

Whereas direct discrimination is generally apparent, making it somewhat combatable, indirect discrimination presents numerous hurdles to detection as well as remedy. Indirect discrimination is the differential treatment of a group based on non-discriminatory factors, but the effect of which is disproportionate as compared to others. As opposed to traditional police practices, algorithmic profiling is more likely to cause indirect discrimination. Indirect discrimination can be the unintentional result of using proxy data, as a machine-learning algorithm may easily infer traits that apply to protected groups and make assessments accordingly, even in the absence of an overtly discriminatory model.¹¹⁵ Therefore, in a neutral risk assessment that neglects context, for instance in designating a groups of neighbourhoods as ‘high crime,’ it would not be the overt policy that a certain group be specifically targeted, even if these neighbourhoods are exclusively inhabited by a particular group and therefore lead to their increased scrutiny by police. This neutral policy in focusing on high crime areas can lead to an ongoing pattern of discrimination against the resident group but also initiate attitudes and stereotypes that continue well into future policing. In addition, by autonomously correlating data, machine learning can create new generations of data, which are also then correlated, raising potential issues of privacy and data

113 European Convention on Human Rights, Article 14.

114 In the context of United States law there are two forms of claims invoking equal protection which both may be the result of direct discrimination; 1) an individual officer acts in a way motivated by race; 2) selective enforcement toward a particular race is the policy of a department. See “Racial Profiling: Legal and Constitutional Issues” (United States Congressional Research Service, April 16, 2012) at 4.

115 A dynamic algorithm refers to one which may update its model according to new correlations among data as a result of machine-learning capability. See European Agency for Fundamental Rights, “Preventing Unlawful Profiling Today and in the Future: A Guide” at 109. See *also* Simmons, “Quantifying Criminal Procedure: How to Unlock the Potential of Big Data in Our Criminal Justice System” at 975.

protection.¹¹⁶ Therefore, even in jurisdictions where protected data may not be collected or coded for policing purposes, it is impossible to rule out discrimination when relying on algorithmic profiling to create risk assessments.¹¹⁷

According to the ECHR, derogations from the prohibition of discrimination are generally allowed when considered to be objectively and reasonably justified.¹¹⁸ The Court has held that this test is only satisfied when the discriminatory behaviour is in pursuit of a legitimate aim and the means are reasonably proportionate to the goal.¹¹⁹ In the case of predictive policing and algorithmic profiling specifically, the legitimate aim is apparent; however, the technology utilized and the legal guidance on its use are unclear. It is therefore impossible to prove its use either proportionate or reasonably justified. This is further complicated by the fact that little conclusive data exist on the success rates of predictive policing. The Court recently held that when treatment of an individual is predicated on a protected characteristic, the test of objectivity and reasonability “must be interpreted as strictly as possible.”¹²⁰ Though little jurisprudence exists on predictive policing, it may be surmised that the current use of algorithmic profiling for the prevention of crime may not be found as weighing strongly enough toward strictly reasonable without a better understanding of its operations and success.

As mentioned above, enforcing the prohibition on discrimination in predictive policing is complicated by the difficulty of procuring a remedy for alleged violations. To claim discrimination the moving party must show that a state actor is acting according to a policy that intentionally discriminates according to a protected classification.¹²¹ In the case of predictive policing the state actor would be the police and the information on which the officer relies is generated by algorithmic processing. In order to successfully show discrimination, the claimant must therefore then prove that 1) the AI is acting according to a discriminatory

116 Council of Europe Committee of experts on internet intermediaries, “Algorithms and Human Rights, Study on the Human Rights Dimensions of Automated Data Processing Techniques and Possible Regulatory Implications,” 2017 at 13. See also Reider-Gordon *et al.*, “Artificial Intelligence, Predictive Analytics, and Unlawful Discrimination.” Also Pasquinelli, “How a Machine Learns and Fails – a Grammar of Error for Artificial Intelligence.”

117 See Law Enforcement Directive (EU) 2016/680 of the European Parliament and of the Council of 27 April 2016.

118 Jim Murdoch and Ralph Roche, “The European Convention on Human Rights and Policing; A Handbook for Police Officers and Other Law Enforcement Officials” (Council of Europe, December 2013) pp. 18-20.

119 European Court of Human Rights, “Guide on Article 14 of the European Convention on Human Rights and on Article 1 of Protocol No. 12 to the Convention – Prohibition of Discrimination” at 15-17.

120 *Case of Lingurar v. Romania*, App. No. 48474/14 (European Court of Human Rights April 16, 2019) at §68.

121 Renata O'Donnell, “Challenging Racist Predictive Policing Algorithms under the Equal Protection Clause,” *New York University Law Review* 94 (2019): 544-80.

algorithm, has undergone machine learning in a way that causes it to discriminate, or the policing agency has programmed the algorithm with biased data. If successful on the first claim, the claimant must then 2) prove that there is a strong nexus between the state actor (policing agency) and the AI program or its developer and controller¹²² sufficient for a court to make a finding that this is state action and not private action.¹²³ Because much of the discrimination in risk assessments may be built on proxy data or unclear designations of a non-specific nature, this may be difficult to prove.¹²⁴ Even further, the complexity of AI and the proprietary nature of predictive policing software make it virtually impossible to show that a police officer was aware and knowledgeable on the algorithm or input data, let alone the average individual plaintiff.

The foregoing three sub-sections have endeavoured to illustrate how the use of AI in crime prevention may hinder citizens' ability to enjoy legal protection in the investigatory processes of crime prevention.¹²⁵ Due to the lack of jurisprudence on the matter and the inconsistent application of predictive policing, much of the foregoing legal analysis is built on a generally accepted understanding of the way in which predictive policing operates in European and American jurisdictions. Due to an expanding focus on crime prevention toward action resembling traditional criminal investigations, this article argues that the legal protections afforded the subjects of investigations must also be expanded. As was also made clear, the use of AI for policing may change accepted practices and standards, and therefore the legal protections must also be adapted. Finally, because the use of AI complicates policing in ways only partially understood at present, it is unlikely that their use will be legally acceptable without further guidance.

V. Notions of Fairness

The foregoing discussion demonstrated that the traditional legal protections afforded the subjects of criminal investigations often do not apply to preventive

122 For evidence of the large role of private companies in predictive policing, see Brennan Center for Justice, "NYPD Predictive Policing Documents; Documents Related to the NYPD's Predictive Policing Trials and Programs," July 12, 2019, <https://www.brennancenter.org/our-work/research-reports/nypd-predictive-policing-documents>.

123 See *Supra* Note 122.

124 For a discussion on the 'black box' problem of AI, see Pasquinelli, "How a Machine Learns and Fails – a Grammar of Error for Artificial Intelligence." See also *Supra* Note 44 at 42-43.

125 Similarly, in the context of Article 14 of the European Convention on Human Rights, a claim may be made of indirect discrimination, in which a neutral rule or requirement is applied equally to everyone, but has an unequal effect on protected groups. See European Agency for Fundamental Rights, "Handbook on European Non-Discrimination Law," Handbook (European Agency for Fundamental Rights, 2010) at 29-31.

investigation, nor would the protections as currently constructed be fully sufficient. This article began by discussing the concept of policing crime as a form of managing risk, in which harms may be avoided by targeted prevention. However, in adopting a pre-emptive approach to crime, as theorized in the precautionary principle, we must accept that mitigating known risk generates new forms of risk.¹²⁶ Criminal law must therefore adapt to new forms of risk to adequately promote justice for all parties in the preventive investigatory process or we risk jeopardizing the traditional notions of our system. In this penultimate section, the discussion will reflect on three foundational notions of criminal justice that without care, could potentially be transformed or abandoned as a result of new modalities of policing.

First, the reasonable suspicion standard was developed with the notion that objective officers observe behaviour by an unknown individual, to make real-time observations and draw their conclusions based on presently available information.¹²⁷ This is intended to ensure equality between individuals in the absence of some indication of wrongdoing. With the addition of advanced predictive policing capabilities, suspicion may be formed prior to the observance of irregular behaviour and regardless of context, due to the monopoly on information possessed by the officer. In other words, reasonable suspicion may be circumvented or unofficially redefined with the added benefit of near limitless information. An otherwise innocent individual may become the subject of police attention due to the belief that noncriminal behaviour has suspicious motive.¹²⁸ By allowing the standard to be weighted so disproportionately toward the police officer undercuts the rationale for the standard. We generally accept that police may require exceptional powers and information to perform their work, but the implication that an individual may be regarded as high risk based primarily on an officer's outside knowledge of him exceeds the bounds of patrol and mirrors something more akin to unjustified surveillance. Within the formal usage of a risk assessment based on set categories, the relative ranking of individuals¹²⁹ against one another is virtually social sorting: that is, the categorization or classification of particular groups according to risk.¹³⁰ In analogizing a stop and search to court room processes, the inequality of arms exceeds what we may consider reasonable, especially in the absence of suspicious behaviour.

126 See Borgers and Van Sliedregt, "The Meaning of the Precautionary Principle for the Assessment of Criminal Measures in the Fight Against Terrorism." *Also Supra* Note 8.

127 *Supra* Note 61 at 326.

128 *Idem*.

129 *Supra* Note 7 at 321. See also, Julie E. Cohen, "Privacy, Visibility, Transparency, and Exposure," *The University of Chicago Law Review* 75 (2008): 181-201.

130 *Supra* Note 5 at 6.

Second, the increased adoption of predictive policing may require a change in how the presumption of innocence is applied in the criminal justice system. It is established that once an individual has been found guilty of a crime he is likely to receive some criminal sanction or punishment and indeed much philosophical thought has been given to the concept of punishment, two of the foremost methods of criminal sanction being rehabilitation¹³¹ and retribution.¹³² Both are intended to provide the individual the ability to serve a legally determined sanction, which acts also as a symbolic service of justice to society and to victims. In addition, rehabilitation serves as an opportunity to treat and restore an individual to his or her constructive role in society. Both forms may be rendered futile if following the conclusion of a sentence the individual remains effectively stuck in the grey area between guilt and innocence.¹³³ Similarly, from a philosophical and practical standpoint, the deterrent effects of criminal punishment are lessened if sentences are not treated with strict adherence and respect by both parties. By releasing an individual following completion of sentence, only to treat him or her as disassociated from the general population weakens the legitimacy of punishment, in particular rehabilitation.¹³⁴ To deprive the defendant of dignity even following the successful completion of court ordered sanctions erases legitimacy from the trial and sentencing process, and hinders the process of re-entering society.¹³⁵ Much like the feedback loop phenomenon present in algorithmic profiling, an emphasis on prior offenders that neglects to acknowledge time served amounts to stigmatization and increases the likelihood of recidivism.¹³⁶

Indeed, the very notion of the presumption is to ensure equality between defendant and the state in the course of a trial. Adherence to the rule of law requires that the state functions to maintain public security while safeguarding

131 United Nations Office on Drugs and Crime, "Introductory Handbook on The Prevention of Recidivism and the Social Reintegration of Offenders" (Criminal Justice Handbook Series, 2018), https://www.unodc.org/documents/justice-and-prison-reform/18-02303_ebook.pdf pp. 3-10.

132 Jacob Bronsther, "Two Theories of Deterrent Punishment," *Tulsa Law Review* 53, no. 3 (2018): 461-96 at 470-471.

133 Criminal records are largely accessible to the public in the United States. The Supreme Court recognizes no per se constitutional right to the privacy of a criminal record; trials must be public; and the First Amendment provides the right to publish information on crime. The extension of this information to private companies has greatly expanded the ability for anyone to access another's record. See Wolitz, "The Stigma of Conviction: Coram Nobis, Civil Disabilities, and the Right to Clear One's Name" at 1317.

134 Some jurisdictions, such as the United States, include within the criminal punishment the physical distancing of the individual for crimes of a sexual nature for a set period toward indefinitely. The distancing is to be at all times disclosed to the public in what has been termed by critics as a means of shaming past sexual offenders.

135 R.A. Lenhardt, "Understanding the Mark: Race, Stigma, and Equality in Context," *New York University Law Review* 79 (June 2004) at 47-48. See also *United Nations Standard Minimum Rules for the Treatment of Prisoners*, Rule 4, Paragraph 1.

136 Meijer and Wessels, "Predictive Policing: Review of Benefits and Drawbacks" at 1036.

the legal interests of individuals against arbitrary treatment and limitless discretion,¹³⁷ via the protection of legal certainty.¹³⁸ If the presumption does not apply outside the strict confines of the courtroom, the balance of power and individual autonomy shifts toward the state.¹³⁹ This may even chip away at the principle of legal certainty.¹⁴⁰ Therefore, by extending the presumption of innocence beyond the trial process, as advocated above, it may better act as the intended 'shield' against arbitrary state interference, ensure the fairness of the criminal justice system, and uphold the philosophy underlying the purpose of criminal punishment.¹⁴¹

Third and finally, there are numerous efficiencies to predictive policing which rightly warrant optimism. However, as has been argued, many of the likely adverse consequences have been neglected by regulators and policymakers, as well as by courts. The ECHR generally requires that to be lawful, the interference by police of an individual right must be both relevant and sufficient for the intended outcome.¹⁴² In order to justify the use of sophisticated preventative measures many potential pitfalls must be addressed. Currently, predictive policing relies on risk assessments that provide questionable levels of specificity, causing inaccuracies that may adversely affect individuals' legal interests. A recent clue as to how the Court may weigh these factors comes from the District Court of The Hague, which found that the use of a particular predictive policing tool for the prevention of financial fraud could not be considered necessary in a democratic society.¹⁴³ The Court found that in order to meet the fair balance required by the ECHR, the intrusion on individuals must be weighed against the value of the tool's use. In this case the predictive software was found to be non-transparent in its processes and therefore not capable of verification as to its value.¹⁴⁴ As predictive policing has to date achieved contestably modest results in preventing crime, without further information it may be argued as insufficient to justify practices that result in potential discrimination and unequal treatment of individuals.

In the broader scope of criminal justice, the use of algorithmic profiling raises numerous questions of how we define due process. If we accept a definition of

137 Brennan-Marquez, "'Plausible Cause': Explanatory Standards in the Age of Powerful Machines" at 1289-1292.

138 Legal certainty requires that the law is foreseeable in its application and sufficiently precise. See Council of Europe, "Guide on Article 5 of the Convention – Right to Liberty and Security," 2014, <https://rm.coe.int/1680700ab0> at 8-9. See also Bronsther, "Two Theories of Deterrent Punishment" pp. 473.

139 *Supra* Note 45 at 9.

140 *Supra* Note 52 at 8-12; 547-551.

141 de Jong and van Lent at 40.

142 *Supra* Note 119 at 18. *Also Supra* Note 52 at 546.

143 *Supra* Note 5 at 7-8.

144 Rb. Den Haag, 05-02-2020, ECLI:NL: RBDHA: 2020:865; See *also Supra* Note 5 at 7-8.

due process in the strictly procedural sense only, namely that it does not apply beyond pre-trial and trial processes, the expanded discretion of police officers may not be warranted according to traditional notions of fairness. Predictive policing that may result in discrimination can only be justified as necessary and proportionate in a democratic society with adequate legal protections in place. As with the expansion of policing practices for counterterrorism in which inchoate pre-crimes are increasingly criminalized and carefully scrutinized, it is necessary that pre-emptive policing is matched with the protection of legal interests and available remedies.

VII. Conclusion

This article has presented predictive policing as the result of a shift toward crime prevention as a preferred means of ensuring public safety. Though theories of predictive policing have changed little over the past several decades, the addition of AI to its application has greatly increased the scope and reach of crime prevention. This article argues that enhanced crime prevention capacity has created a new category of investigation, namely, preventive investigation. Though this often has an effect on individual legal interests comparable to traditional criminal investigations, preventive investigations do not trigger the adequate legal safeguards generally due suspects or defendants. The legal protections analysed in this piece are the standard of reasonable suspicion, the presumption of innocence, and the prohibition on discrimination. In addition, should these tenets of criminal justice be eroded by the use of advancing technological policing methods, the very notion of due process may be transformed. The article therefore posits that in order to effectively and lawfully use predictive policing to prevent crime, its application must adhere to the existing legal framework and must properly address the technological consequences of preventative investigations.

Bibliography

- AMOORE, Louise (2011) "Data Derivatives; On the Emergence of a Security Risk Calculus for Our Times," *Theory, Culture & Society* 28, no. 6, 24-43.
- ASHWORTH, Andrew (2006) "Four Threats to the Presumption of Innocence," *The International Journal of Evidence & Proof*, no. 10, 241-79.
- BARRETT, Lindsay (2017) "Reasonably Suspicious Algorithms: Predictive Policing at the United States Border" *N.Y.U. Review of Law & Social Change*, 327-363.

- BORGERS, Matthias, *et al.* (2009) “The Meaning of the Precautionary Principle for the Assessment of Criminal Measures in the Fight Against Terrorism,” *Erasmus Law Review* 2, no. 2, 171-195.
- BRANTINGHAM, Jeffrey (2018) “The Logic of Data Bias and Its Impact on Place-Based Predictive Policing,” *Ohio State Journal of Criminal Law* 15, 473-486.
- BRANTINGHAM, Jeffrey, *et al.* (2018) “Does Predictive Policing Lead to Biased Arrests? Results From a Randomized Controlled Trial,” *Statistics and Public Policy* 5, no. 1, 1-6.
- BRAND, Dirk (2020) “Algorithmic Decision-Making and the Law,” *EJournal of EDemocracy* 12, no. 1, 115-132.
- BRENNAN CENTER FOR JUSTICE (2019) “NYPD PREDICTIVE POLICING DOCUMENTS; DOCUMENTS RELATED TO THE NYPD’S PREDICTIVE POLICING TRIALS AND PROGRAMS,” <https://www.brennancenter.org/our-work/research-reports/nypd-predictive-policing-documents>.
- BRENNAN-MARQUEZ, Kiel (2017) “‘Plausible Cause’: Explanatory Standards in the Age of Powerful Machines,” *Vanderbilt Law Review* 70, no. 4, 1249-1301.
- BRONSTHER, Jacob (2018) “Two Theories of Deterrent Punishment,” *Tulsa Law Review* 53, no. 3, 461-496.
- BUZAROVSKA, Gordana (2015) “Interpretation of ‘Equality of Arms’ in Jurisprudence of Ad Hoc Tribunals and ICC,” *SEEU Review* 11, no. 1, 28-39.
- CAMPBELL, Liz (2012) “A Rights-based Analysis of DNA Retention” *Criminal Law Review*, no. 12, 889-905.
- CAMPBELL, Liz (2012) “Criminal Labels, The European Convention On Human Rights And The Presumption of Innocence” *University of Edinburgh School of Law Research Paper Series*.
- CHANEY, Spencer, *et al.* (2008) “The Utility of Hotspot Mapping for Predicting Spatial Patterns of Crime,” *Security Journal* 21, 4-28.
- CINO, Jessica Gabel (2018) “Deploying the Secret Police: The Use of Algorithms in the Criminal Justice System,” *Georgia State University Law Review* 34, no. 4, 1073-1102.
- COHEN, Julie E. (2008) “Privacy, Visibility, Transparency, and Exposure,” *The University of Chicago Law Review*, 75, 181-201.
- COUNCIL OF EUROPE COMMITTEE OF EXPERTS ON INTERNET INTERMEDIARIES (2017) “ALGORITHMS AND HUMAN RIGHTS, Study on the Human Rights Dimensions of Automated Data Processing Techniques and Possible Regulatory Implications.”
- COUNCIL OF EUROPE (2014) “Guide on Article 5 of the Convention – Right to Liberty and Security,” <https://rm.coe.int/1680700ab0>.
- DE JONG, Ferry, *et al.* (2016) “The Presumption of Innocence as a Counterfactual Principle,” *Utrecht Law Review* 12, no. 1, 32-49.

- DE LAAT, Paul (2019) "The Disciplinary Power of Predictive Algorithms: A Foucauldian Perspective," *Ethics and Information Technology*, no. 21, 319-329.
- ECK, John, et al. (2015) "Crimes Places in Crime Theory," *Crime and Place: Crime Prevention Studies*, no. 4, 1-33.
- EUROPEAN AGENCY FOR FUNDAMENTAL RIGHTS (2018) "PREVENTING UNLAWFUL PROFILING TODAY AND IN THE FUTURE: A GUIDE."
- EUROPEAN AGENCY FOR FUNDAMENTAL RIGHTS (2010) "HANDBOOK ON EUROPEAN NON-DISCRIMINATION LAW."
- EUROPEAN AGENCY FOR FUNDAMENTAL RIGHTS (2010) "UNDERSTANDING AND PREVENTING DISCRIMINATORY ETHNIC PROFILING: A GUIDE," *Towards More Effective Policing*.
- EUROPEAN PARLIAMENT (2016) (EU) 2016/680 Directive of the European Parliament and of the Council on the protection of natural persons with regard to the processing of personal data by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, and on the free movement of such data.
- EUROPEAN COURT OF HUMAN RIGHTS (2019) "Guide on Article 14 of the European Convention on Human Rights and on Article 1 of Protocol No. 12 to the Convention – Prohibition of Discrimination."
- EUROPEAN COMMISSION AGAINST RACISM AND INTOLERANCE, Combating Racism and Discrimination in Policing (2007) ECRI General Policy Recommendation No. 11, <https://rm.coe.int/ecri-general-policy-recommendation-no-11-key-topics-combating-racism-a/16808b7639>.
- COUNCIL OF EUROPE, *European Convention for the Protection of Human Rights and Fundamental Freedoms*, as amended by Protocols Nos. 11 and 14, 4 November 1950, ETS 5, available at: <https://www.refworld.org/docid/3ae6b3b04.html>.
- FERGUSON, Andrew Guthrie (2011) "Crime Mapping and the Fourth Amendment: Redrawing 'High-Crime Areas,'" *Hastings Law Journal* 63, no. 1, 179-232.
- FERGUSON, Andrew Guthrie (2012) "Predictive Policing and Reasonable Suspicion," *Emory Law Journal* 62, no. 259, 261-325.
- FERGUSON, Andrew Guthrie (2015) "Big Data and Predictive Reasonable Suspicion," *University of Pennsylvania Law Review* 163, no. 2, 327-410.
- GALIC, Masa, et al. (2017) "Bentham, Deleuze and Beyond: An Overview of Surveillance Theories from the Panopticon to Participation" *Philos. Technol.*, Vol. 30, 9-37.
- GALETTA, Antonella (2013) "The Changing Nature of the Presumption of Innocence in Today's Surveillance Societies: Rewrite Human Rights or Regulate the Use of Surveillance Technologies?," *European Journal of Law and Technology* 4, no. 2.
- GARLAND, David (2001) *The Culture of Control*.

- GEORGE, Rohan (2015) "Predictive Policing: What Is It, How It Works, and Its Legal Implications," *The Centre for Internet & Society Blog*.
- GETOS KALA, Anna-Maria (2020) "Guilt, Dangerousness and Liability in the Era of Pre-Crime – the Role of Criminology? To Adapt, or to Die, That Is the Question!" Biannual Conference of the Scientific Association of German, Austrian and Swiss Criminologists.
- HAGGERTY, *et al.* (1997) *Policing the Risk Society*.
- HAGGERTY, Kevin D., *et al.* (2000) "The Surveillant Assemblage," *British Journal of Sociology* 51, no. 4, 605-622.
- HARDYNS, Wim, *et al.* (2018) "Predictive Policing as a New Tool for Law Enforcement? Recent Developments and Challenges," *Eur J Crim Policy Res* 24, 201-218.
- HIRSCH BALLIN, Marianne F. H. (2012) *Anticipative Criminal Investigation: Theory and Counterterrorism Practice in the Netherlands and the United States*.
- HUNG, Tzu-Wei, *et al.* (2020) "On the Person-Based Predictive Policing of AI," *Ethics and Information Technology*.
- HVISTENDAHL, Mara (2016) "Can 'Predictive Policing' Prevent Crime before It Happens?," *ScienceMag.Org*.
- JANSEN, Fieke (2018) "Data Driven Policing in the Context of Europe, Working Paper," DATAJUSTICE.
- JONES, Stephen (2009) *Criminology*.
- KEHL, Danielle, *et al.* (2017) "Algorithms in the Criminal Justice System: Assessing the Use of Risk Assessments in Sentencing," *Responsive Communities Initiative*, Berkman Klein Center for Internet & Society, Harvard Law School, <http://nrs.harvard.edu/urn-3:HUL.InstRepos:33746041>.
- KENNEDY, Leslie, *et al.* (2011) "Risk Clusters, Hotspots, and Spatial Intelligence: Risk Terrain Modeling as an Algorithm for Police Resource Allocation Strategies," *J Quant Criminol*, 339-362.
- LAW SOCIETY COMMISSION ON THE USE OF ALGORITHMS IN THE JUSTICE SYSTEM AND THE LAW SOCIETY OF ENGLAND AND WALES (2019) "ALGORITHMS IN THE CRIMINAL JUSTICE SYSTEM."
- LENHARDT, R. A. (2004) "Understanding the Mark: Race, Stigma, and Equality in Context," *New York University Law Review*, No. 79.
- LYON, David (ed.) (2002) *Surveillance As Social Sorting, Privacy, Risk and Digital Discrimination*.
- LUM, Kristian (2016) "To Predict and Serve?" Royal Statistical Society, <https://rss.onlinelibrary.wiley.com/doi/full/10.1111/j.1740-9713.2016.00960.x>.
- MENDOLA, Marco (2016) "One Step Further in the 'Surveillance Society': The Case of Predictive Policing," Leiden University Tech and Law Center.
- MURDOCH, Jim, *et al.* (2013) "The European Convention on Human Rights and

- Policing; A Handbook for Police Officers and Other Law Enforcement Officials,” Council of Europe.
- MURRAY v. THE UNITED KINGDOM, no. 14310/88, ECHR (October 28, 1994).
- O'DONNELL, Renata (2019) “Challenging Racist Predictive Policing Algorithms under the Equal Protection Clause,” *New York University Law Review*, No. 94, 544-580.
- O'MALLEY, Pat (1996) “Risk and Responsibility,” in *Foucault and Political Reason*.
- O'NEIL, Cathy (2016) *Weapons of Math Destruction*.
- OSOBA, Osonde, et al. (2017) *An Intelligence in Our Image: The Risks of Bias and Errors in Artificial Intelligence*, RAND Corporation.
- PASQUINELLI, Matteo (2019) “How a Machine Learns and Fails – a Grammar of Error for Artificial Intelligence,” *Journal for Digital Cultures*, No. 5.
- PATAKI & DUNSHIRN v. AUSTRIA, no. 596/59 and 789/60, ECHR report of 28 March 1963, *Yearbook Volume 6, 1963*.
- PERRY, Walter, et al. (2013) *Predictive Policing: The Role of Crime Forecasting in Law Enforcement Operations*, RAND Corporation, <http://ebookcentral.proquest.com/lib/unilu-ebooks/detail.action?docID=1437438>.
- POULLET, Yves (2020) “Data Protection Webinar 2: Profiling” Webinar, Council of Europe Directorate General Human Rights and Rule of Law Data Protection Series, https://www.youtube.com/watch?v=8qHO_DhpDbg&feature=youtu.be&fbclid=IwAR1Q4mVJjUvu8G9wdjMyLqIrUzPOHn3JLCtqXso2E-v684W_D6VAFJg8D4kw.
- RB. DEN HAAG, 05-02-2020, ECLI:NL: RBDHA: 2020:865.
- REIDER-GORDON, Mikhail, et al. (2020) “Artificial Intelligence, Predictive Analytics, and Unlawful Discrimination,” American Bar Association Annual Meeting.
- SELBST, Andrew (2017) “Disparate Impact in Big Data Policing,” *Georgia Law Review*, 52, 109-95.
- SIEBER, Ulrich (2018) *Alternative Systems of Crime Control; National, Transnational, and International Dimensions*, Reports on Research in Criminal Law, S 161.
- SIMMONS, Ric (2016) “Quantifying Criminal Procedure: How to Unlock the Potential of Big Data in Our Criminal Justice System,” *Michigan State Law Review*, 947-1017.
- STRIKWERDA, Litska (2020) “Predictive Policing: The Risks Associated with Risk Assessment,” *The Police Journal: Theory, Practice and Principles*, 1-15.
- UNITED NATIONS OFFICE ON DRUGS AND CRIME (2018) “Introductory Handbook on The Prevention of Recidivism and the Social Reintegration of Offenders,” *Criminal Justice Handbook Series*, https://www.unodc.org/documents/justice-and-prison-reform/18-02303_ebook.pdf.
- UNITED NATIONS (1955) Standard Minimum Rules for the Treatment of Prisoners, 30 August 1955, available at: <https://www.refworld.org/docid/3ae6b36e8.html>.

- UNITED STATES CONGRESSIONAL RESEARCH SERVICE (2012) "Racial Profiling: Legal and Constitutional Issues."
- UNITED STATES DEPARTMENT OF HOMELAND SECURITY (2013) "GEOGRAPHIC INFORMATION SYSTEMS AND PREDICTIVE POLICING APPLICATION NOTE," *Science and Technology*.
- UNITED STATES NATIONAL INSTITUTE OF DEFENSE (2016) "CRIME MAPPING & ANALYSIS PROGRAM EXTRA READING MATERIAL, Intermediate Crime Mapping Using ArcGIS 10.1," <https://nij.ojp.gov/topics/articles/course-materials-crime-mapping-using-arcgis-101>.
- VALVERDE, Mariana, *et al.* (2004) "Insecurity and the Dream of Targeted Governance," in *Global Governmentality: Governing International Spaces*, 233-250.
- VAN BRAKEL, Rosamunde, *et al.* (2011) "Policing, Surveillance and Law in a Pre-Crime Society: Understanding the Consequences of Technology Based Strategies," *Cahiers Politiestudies Jaargana*, Vol. 3, no. 20, 163-192.
- VAN SLIEDREGT, Elies (2009) "A Contemporary Reflection on the Presumption of Innocence," *Revue Internationale de Droit Penal* 80, no. 1, 247-267.
- WEISBURD, David (2015) "The Law of Crime Concentration and the Criminology of Place," *Criminology*, Vol. 52, no. 2. 133-157.
- WELSH, Brandon, *et al.* (2012) *The Oxford Handbook of Crime Prevention*, Oxford University Press.
- WILSON, Dean (2017) "Algorithmic Patrol," *Big Data, Crime and Social Control*.
- WOLITZ, David (2009) "The Stigma of Conviction: Coram Nobis, Civil Disabilities, and the Right to Clear One's Name," *Brigham Young University Law Review*, no. 5, 1277-1340.

